Impact of Covid-19 Pandemic on Nigerian Capital Market: The Imperative of Testing the Efficacy of Efficient Market Hypothesis

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Abstract

In this paper we reviewed the efficacy of Efficient Market Hypothesis (EMH) on the outbreak of Covid-19 on Nigerian Capital Market. The EMH is a theory based on informational efficiency by the capital markets owing to their quick and instantaneous incorporation of new information. The study tested the market in two parameters: to confirm the randomness (efficiency of the market) using run-test, and to confirm the effect of Covid-19 protocols on some economic fundamentals using regression analysis. The result of the run-test of the daily Nigerian capital market data (April, 2020 to July 2020) revealed randomness within the period under review. The regression analysis however revealed significant relationship between the markets and some economic fundamental indicators (inflation and international price of crude oil) of the economy. The paper concluded that the Nigerian Capital Markets revealed randomness signifying a weak form of EMH as news about the Corona Virus was incorporated slowly but not instantaneously during the period under review, and hence, the pandemic did affect the market. The study also posited that EMH can be tested and validated not only from economic or finance point of view but also from public health view of the outbreak of Corona Virus. The paper recommended that policy makers in the country should devise a proper hedging mechanism to be put in place to mitigate any unforeseen negative market reactions in future as a result of any health pandemic.

Keywords: Corona Virus (Covid-19), Efficient Market Hypothesis (EMH), Run-test, Randomness, Informational efficiency.

1.0 Introduction:

Capital markets all over the world have traded wildly for over a year since the outbreak of Covid-19 popularly called the Corona Virus; as event managers, investors and policy makers have tried to come to grips with the sudden rise in the number of virus cases, and the threat to the global economy posed by measures to contain the pandemic (Moon, 2020). For example, Wall Street (2020) was gripped over the spreading of Covid-19 as stocks tumbled and investors rushed into the safety net of government bonds, and oil prices nose-dived in the global oil market. Reports showed the world is likely to go in recession, as analyst at United Nations (UN) say the world's $80 trillion economy will decline by $1 trillion to $2 trillion – a close to 3% contraction in 2020 to 2021 (Akanni & Gabriel, 2020).

Business activities have been disrupted globally as Covid-19 pandemic intensify and worldwide gatherings (in terms of conferences and workshops), sporting events, economic transactions have all been affected by the outbreak. Economically, according to Ezebuike (2020), the global supply chain substantially relies on production from China and the disruption in China, thus affects almost all economies and markets as a result. American, European and African markets have been on a bearish run and from the home front; the pandemic has been of dilapidating effect on the Nigerian economy. Nigeria's revenue is 80% from oil receipt and the 2020 budget was bench marked on the crude oil price of $57 per barrel. However, the ongoing disruption caused by the Covid-19 pandemic has plunged crude oil prices to below $29 per barrel as at April 2020, necessitating the review of the budget downward (Ezebuike, 2020).

Since the advent of the Corona Virus pandemic, global capital markets all over the world has witnessed a sharp decline in their activities as their All share index nose-dived to a record low, signifying the intensity of the pandemic and the information available to the investing public that affects the markets globally. Figure 1 below, shows the impact of covid-19 since the outbreak on the world largest stock market; The Nikkei of Japan, Dow Jones of the USA and FTSE of the United Kingdom, all trading at a negative territory (Bloomberg, 2020).

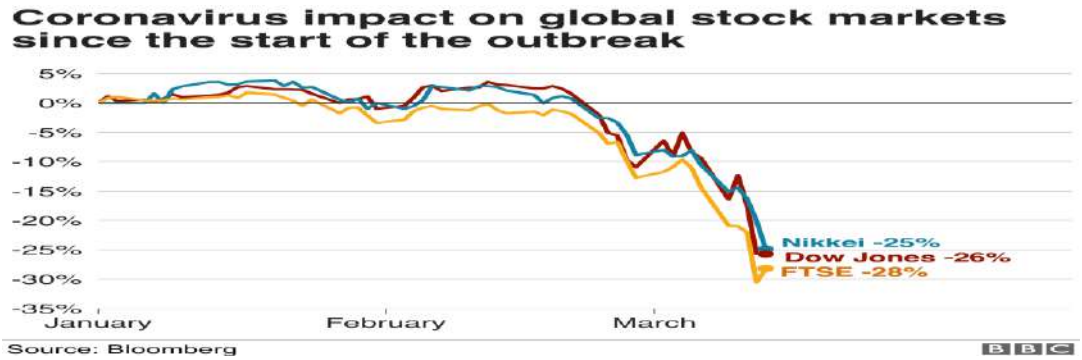


Figure 1. Covid-19 impacts on Global stock markets (Jan to April, 2020)

In a paper presented at the IMF, Gopinath (2020) stressed that the world has changed dramatically in the last 3 to 4 months (i.e. January to April, 2020) as a result of a rare disease, a Corona Virus pandemic that resulted in a tragically large number of human lives being lost. As countries implement necessary quarantines and social distancing practices to contain the pandemic, the world has been put in a great lockdown. The magnitude and speed of collapse in economic activity that has followed is unlike

anything experienced in our lifetimes since the great depression of the 1930's.

Segal and Gerstel (2020) argued that, this is truly a global crisis as no country is spared. Countries reliant on tourism, travel, hospitality and entertainment for their growth are experiencing particularly large disruptions. Emerging markets and developing economies face additional challenges with unprecedented reversals in capital flows as global risk appetite wanes and currency pressures, while coping with weaker health systems, and more limited fiscal space to provide support. Moreover, several economies entered this crisis in a vulnerable state with sluggish growth and high debt levels.

The covid-19 pandemic has brought an unprecedented crisis globally; people and governments globally are still struggling for solutions to deal with the crisis. The effects are very broad based, be it on health, way of life and economics. With global economy plunge into recession in 2020, studies have shown that some countries did experienced the recession within a short period, like the USA (Blake, 2021) as according to US National Bureau of economic research, the contraction lasted just three months (February to April, 2020). Conversely, it lasted several months in other countries like Nigeria as the economy shrinks two quarters in a row amid contraction in its oil sector (Aljazeera, 2020). According to the world bank (2021), the impact of Covid-19 outbreak on capital market globally at the initial stage has been acute with sharp price adjustment observed across fixed-income and equity markets and in the process triggers the following developments; liberal market volatility and repricing. Hence, the objective of this paper is to empirically test the efficacy of EMH as a result of Covid-19 pandemic in the Nigerian capital market with a view to ascertained its level of efficiency.

In Nigeria, Covid-19 case was officially identified on the 27th of February 2020 and few more cases were identified afterwards (Effiong, 2020). The consequences of Covid-19 on the economy and financial markets in Nigeria are: economic lockdown of major cities (Abuja, Lagos, Ogun, Kano states) on the 30th of March 2020 leading to economic loss especially for daily income earners from small, medium scale businesses, withdrawal of money by investors from the capital market and fall in oil prices with a sharp devaluation of the nation currency, the Naira (Ozilli, 2020)

Being into this bizarre situation, the objectives of this paper is to review the efficacy of EMH on the outbreak of Corona Virus on global capital market with

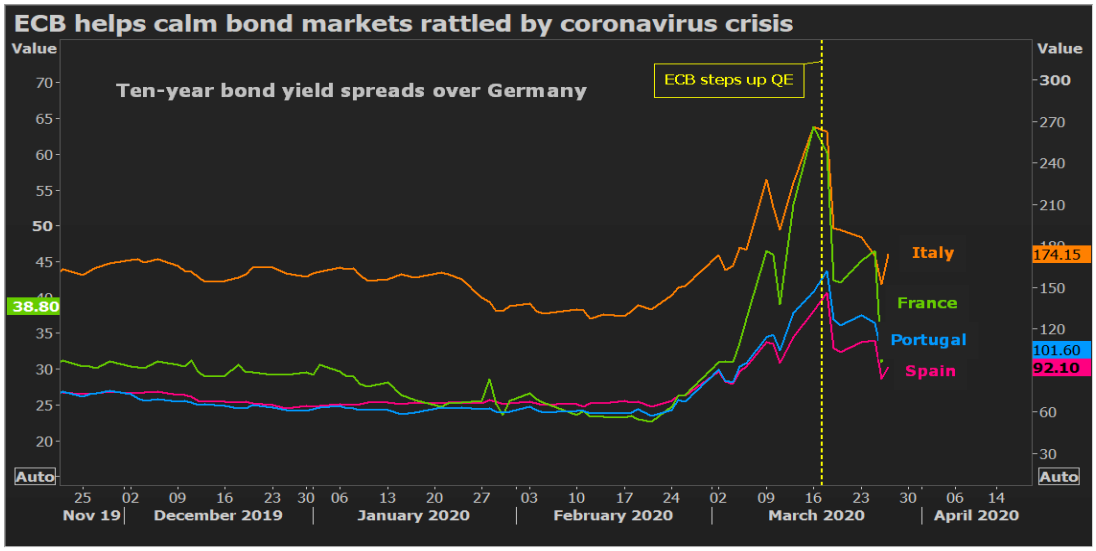
emphasis on Nigerian Capital Market (NCM) and also to look at how policy makers play their role in offering solutions to this crisis that needs to be explored, studied and discussed.

1.2 Statement of the problem

An important debate among investors is whether the stock market is efficient—that is, whether it reflects all the information made available to market participants at any given time. The EMH maintains that all stocks are perfectly priced according to their inherent investment properties, the knowledge of which all market participants possess equally. However, financial theories are subjective in nature. In other words, there are no proven laws in finance but rather ideas and experience that try to explain how the market works (Dhir & Kvilhaug, 2021). In this study, we take a look at where the EMH has fallen short in terms of explaining the stock market's behaviour especially in the era of Covid-19. While it may be easy to see a number of deficiencies in the theory, it's important to explore its relevance in the modern investing environment of which Covid-19 pandemic has given an excellent opportunity.

Seasoned investors such as Warren Buffet, George Soros and many academicians have disputed the EMH both theoretically and empirically. A major theory challenging the EMH is Behavioural Finance Theory which attributes imperfections in financial markets to a combination of cognitive biases such as overreaction, over confidence, herding behaviour, representative bias, information bias and various human errors in information processing and reasoning. The consequences of these being that some investors make abnormal return (profits) while others incur losses in all the three forms of market efficiency (Pillai & Pillai, 2021).

With economic activity disrupted and capital markets dislocated worldwide, investors and researchers have been debating if COVID-19 could derail the global financial cycle. According to Stanley (2020) given the sharp drops in global asset markets recently, the Corona Virus could deliver a sizable impact to global growth in the first half of the year 2020. Nigeria, like most countries, was hit on two fronts; directly as a result of cases in the country, and indirectly, due to our closeness with–badly hit China, our number one infrastructure financier and trading partner, plus our reliance on global oil prices (Akanni & Gabriel, 2020). The effect of the pandemic can be seen from Figure 2 below, with some European countries markets and the reactions of their stock markets.



Source: European Central Bank [(ECB), 2020

As the Corona Virus succeeded in shaking up the financial market around the globe, Quiggin (2020) reported that the pandemic has provided yet more evidence against the EMH. In reality, financial markets woke up to the severity of the crisis around the same time as the general public with privilege information tried and outsmarted the markets based on the assessment by government analyst, pointing to the likely severity of the crisis and in the process, sold their shares early and make huge returns, as in the case of U.S. Senator Richard Burr.

Analyzing the impact of Covid-19 on Nigerian economy, Ozilli (2020) found that the economic downturn in Nigeria was triggered by a combination of declining oil price and spillovers from the covid-19 outbreak, which not only led to a fall in the demand for oil products but also stopped economic activities from taking place when social distancing policies were enforced. Then, Nigerian government responded to the crisis by providing financial assistance to businesses, not to households that were badly affected by the pandemic. The monetary authority adopted accommodative monetary policies and offered a targeted 3.5 trillion naira loan to support some sectors of the economy. Despite the loan, economic agents refused to engage in economic activities for fear of contracting the Covid-19 disease that was spreading very fast at that time.

Analyzing the global economic outlook in an IMF paper, Gopinath (2020) asserted that for the first time since the Great depression, the advanced economies, emerging markets and developing economies were in recession. For year 2020, growth in advanced economies is projected at -6.1 percent. Emerging market and developing

economies with normal growth levels well above advanced economies are also projected to have negative growth rates of -1.0 percent in 2020, and -2.2 percent, while China recorded a growth rate of +1.1 percentage point and Nigerian economy recorded a -3.4 growth as shown below in Table I.

Table1. World Economic Outlook Growth Projections: The Effect of Covid-19 Pandemic

Real GDP, Annual Percentage Change	2019	2020	2021
World Output	2.9	-3.0	5.8
Advanced Economies	1.7	-6.1	4.5
United States of America	2.3	-5.9	4.7
Germany	0.6	-7.0	5.2
France	1.3	-7.2	4.5
Italy	0.3	-9.1	4.8
Spain	2.0	-8.0	4.3
Japan	0.7	-5.2	3.0
United Kingdom	1.4	-6.5	4.0
Canada	1.6	-6.2	4.2
China	6.1	1.2	9.2
India	4.2	1.9	7.4
Russia	1.3	-5.5	3.5
Brazil	1.1	-5.3	2.9
Mexico	-0.1	-6.6	3.0
Saudi Arabia	0.3	-2.3	2.9
Nigeria	2.2	-3.4	2.4
South Africa	0.2	-5.8	4.0

Source: IMF, World Economic Outlook, April, 2020.

According to Nigerian stock Exchange (NSE, 2020), the novel Corona Virus pandemic caused a severe slowdown in global growth in Q1 2020. On the back of aggressive isolation measures and nationwide lockdowns in major economies, the first quarter of the year was characterized by weak consumer demand, steep declines in global oil prices and bearish stock markets. At the NSE, all equity market indexes ended the quarter in negative territory, despite major gains recorded in January 2020 when it became one of the best performing indexes in the world, the All Share Index of the NSE closed the quarter at 21,300.47 points, down 31.38% from Q1 2019.

Fitch (2020), the world renowned rating agency, asserted that the increased market volatility is likely to reduce issuance activity, which hurts capital market revenues. The rating agency further continues that, while volatility can sometimes drive revenues, recent market

swings and spikes in trading volumes indicate a high level of uncertainty over the intensity, geographic reach and duration of the Corona Virus. The rating agency argued that the current market situation is similar to the selloffs in the fourth quarter of 2008 and in the first quarter of 2016 when transaction volumes plummeted after investors reshuffled their portfolios due to global meltdown of those years. While investment strategists remain cautiously optimistic about capital market activity later in the year, many of their best-case scenarios are contingent on the containment of the virus in the near future.

According to IMF, the assumption that the pandemic and the required containment peaks in the second quarter of the year for most countries in the world may ultimately recedes in the second half of this year as the global growth in 2020 is projected to fall to a negative -3 percentage point. This is a downgrade of 6.3 percentage points from January 2020 projections. This makes the great lockdown the worst recession since the great depression, and far worse than the global financial crisis of 2008. As a result, the cumulative loss to global GDP in 2020 from the pandemic crisis could be around nine (9) trillion dollars, greater than the economies of Japan and Germany combined (IMF, 2020).

Generally, there are no studies in Nigeria that sought to establish the informational efficiency (Efficient Market Hypothesis) of the Nigerian capital market to the announcement of Covid-19 pandemic using a run-test statistical analysis. While studies have been conducted to investigate the reaction of the Nigerian stock market to dividends, earnings and top management change announcements and market reactions to Initial Public Offerings (IPOs), there are however, no studies that are known to the researchers that were conducted on the reaction of the market to the current global pandemic of Covid-19 using a run-test statistical analysis, hence, the gap of the study. It is therefore, the considered opinion of this researchers to review other important studies on market reactions to other corporate event announcements globally and link them with capital market reactions with any available news on Covid-19.

Based on the aforementioned problem this paper seeks to answer the following questions.

i. Does Nigerian capital market exhibit strong, semi-strong or weak form of EMH after the national lockdown was proclaimed?
ii. How Covid-19 pandemic affect event activities and some economic fundamentals in Nigeria?

The objective of this paper is to review the efficacy of EMH on the outbreak of Covid-19 on Nigerian Capital Market. The specific objectives of the paper are:

i. to examine the effect of Covid-19 lockdown on capital market in Nigeria and to ascertain the extents of Nigerian Capital Market exhibiting a strong, semi-strong or weak form EMH, and
ii. to assess the effect of Covid-19 on event activities and some economic fundamentals in Nigeria during the pandemic.

In order to achieve the objectives of this study, the following hypotheses are hereby raised based on the main lines of research identified in the literature:

$H_{01:}$ News of Covid-19 lockdown did not reveal Nigerian Capital Market exhibiting strong, semi-strong and a weak form of the EMH.

Objective number two is sub-divided into the following hypotheses:

$H_{02a:}$ NSE index has been affected by the number of Covid-19 new cases and new death,

$H_{02b:}$ NSE index has been positively influenced by the monetary policy (interest rate),

$H_{02c:}$ NSE index has been positively influenced by inflation, and

$H_{02d:}$ NSE index is significantly influenced by the price of crude oil.

1.3 Scope of the Study:

The study covers a period of 4 month (April 2020 to July 2020). It is believed that the pandemic was at its peak during those periods, and the data is enough to make an informed analysis on market reactions to the announcement of the pandemic and its protocols vis-à-vis capital market reactions.

2.0 Literature Review

Hatmanu and Cautisanu (2021) studied the impact of Covid-19 pandemic on Romanian stock market between March, 2020 to April, 2021 using Autoregressive Distributed Lag (ARDL) bound cointegration and the result showed a significant long-term negative impact of the pandemic on the Bucharest exchange trading index of the Romanian stock market.

El-sayed and Abdelhakim (2021) used multiple regression analysis to investigate the impact of new cases and deaths due to Covid-19 between March 2020 and 10 May 2020 in the Egyptian stock market on 17 sectors (IT, Media, food and beverages, Tobacco and Banking etc.). The study showed that the return of most sectors appeared to be more sensitive to cumulative mortality indicators than to daily deaths, while the new cases from Corona Virus were more important than the cumulative cases of Corona Virus. Kartal et al.'s (2021) study focused on the East Asian countries

(i.e. China, Hong Kong, Japan, Mongolia, Korea and Taiwan). The authors found that market indices to the Covid-19 using quantile regression models revealed negative effect of the pandemic on the studied samples.

Al-Awadhi et al. (2021) examined the effect of Covid-19 on the companies included into the most important stock market indices in China (Hang Seng Index and Shanghai stock exchange composite index) over the period 10 Jan to 16 march, 2020 using a panel data approach and found out that they were significantly negative related to both the daily growth in total new cases and total new deaths caused by the Corona-virus. Similar results were reported by Adenomon, et al (2021) in Nigeria using GARTCH models who found a negative effect of the pandemic variables on the stock market from January, 2 to April, 2020.

Zoughrana, et al (2021), conducted a study in Francophone African countries on the stock returns of companies listed on the West African Economic and Monetary Union Stock Market (comprising of Benin, Burkina Faso, Ivory Coast, Guinea-Bissau, Mali, Niger, Senegal and Togo) during the Covid-19 outbreak. The paper's aim was to see the effect of governments' Covid-19 protocols measure on companies listed on the various stock markets. The paper found that social distancing and other government measures were associated with a positive reaction of the market movement, restrictions and lockdown measures contributed to a decline in the stock value.

Evangelos (2021) examined how the largest stock market of the world, the U.S and particularly the S & P500 index, reacted during the Covid-19 outbreak from 2nd Jan, 2020 to 30th April, 2020, using a simple financial analysis procedure. The researchers juxtaposed the released news with the respective market performance in order to see how the market always incorporated available information in time. The result showed that in some periods under review, the market was not moving as it was expected, and the run-test analysis statistically confirmed the author's assumption that, the U.S stock market was not always efficient during the Corona Virus outbreak as the market behaviour was unpredictable for a rational asset pricing model and did not instantaneously incorporate new information about the pandemic.

Tadoori and Vadithata (2021) examined the test of market efficiency during Covid-19 in a select of global market indices. The paper analyzed the efficiency of 44 world major stock exchanges (Asia-Pacific-17, Europe-16, America-6 & Africa-5) from November

2019 to January 2021 and tested whether market shares moved randomly or returned in adaptive nature; that is whether EMH hold true in conditions like Covid-19 era or Adaptive market hypothesis (AMH). The result suggested that the opposite of EMH hold true. Results of the study using variance-test ratio proved that market are adaptive especially in pandemic situation.

Pillai and Pillai (2021) in their paper examined the efficiency of the Indian stock market during the time of Covid-19. The study employed event study as the methodology of the paper and concluded that Indian stock markets were inefficient during the pandemic in the period under review. The paper further proved there were numerous opportunities to make abnormal returns, thereby punctuating the main underpinning aims of EMH and the results of this research helps one to understand investor's behaviour and sentiments.

In Nigeria, Covid-19 case was officially identified on the 27th of February 2020 and few more cases were identified afterwards (Effiong, 2020). The consequences of Covid-19 on the economy and financial markets in Nigeria are: economic lockdown of major cities (Abuja, Lagos, Ogun, Kano states) on the 30th of March 2020 leading to economic loss especially for daily income earners from small, medium scale businesses, withdrawal of money by investors from the capital market and fall in oil prices with a sharp devaluation of the nation currency, the Naira (Ozilli, 2020)

The pandemic context prompted unparalleled global responses and on the national levels, authority of different countries imposed several containment measures to reduce the spread of the disease, among which are; social distancing, lockdown, wearing of mask and travel bans. All of these measures have had a profound effect on individual country's economy. Ozilli and Arun (2020) studied the impact of social distancing policies on the stock market indicators of Japan, the United Kingdom, the United States and South Africa using a panel data approach. The main results revealed that from 23 March, 2020 to 23 April, 2020, the stock markets were negatively influenced by the number of lockdown days and by the international travel restriction, but showed positive sign by restriction on internal movement.

Following Ozilli and Arun (2020) study, Chowdhury et al, (2021) extended the analysis by including some countries from Europe using similar panel approach. The authors revealed that the number of lockdowns days and the number of Corona Virus patients, restrictions on internal

movements and international travel restrictions affected the stock markets price.

Osagie, Maijama'a and John (2020) using a GATCH models in assessing the effects of Covid-19 outbreak on the Nigerian stock exchange performance from March to April 2020, revealed that a substantial loss in stocks return and high volatility in stock return was reported within the period under review by applying the GATCH models. Adenomon (2020) in his study found that it created an unprecedented level of risk, causing investors to suffer significant losses in a very short period of time as investors panic and moved to sell and salvage their investment. Ozilli (2020) in an analysis of the Covid-19 spillovers in Nigeria found that the existing structural weaknesses in Nigeria economy contributed to making the crisis more severe in the country.

Beck, Flynn & Homanen (2020) analyzed the effect of Covid-19 on emerging markets by employing a survey response from April 2020 across nearly 500 listed firms. The study revealed that vast majority of firms have been negatively affected by the lockdown and hence, reacted by reducing level of investment as stakeholder-centric firms experienced lower stock price declines during the crisis drawdown.

Study conducted by Carlson (2020) on the reactions of the world's stock markets around the time of the onset of the Corona Virus pandemic seemed illogical to many observers. The S&P 500 stock price index set an all-time record high on February 19, 2020, after over a month's news of the epidemic. The World Health Organization had already labeled it a "public health emergency of international concern" on January 30 when the epidemic had already spread from China to 18 countries. From that high, the S&P 500 fell 34% to a low on March 23, 2020.The economic expert has an explanation for this difficulty based on the idea that markets are "efficient." If markets are perfect, prices will incorporate all publicly available information about the future. Speculative prices will be a "random walk. The changes in prices will look random because they respond only to the news. News, by the very fact that it is new, has to be unforecastable. The market is smarter than any individual as the theory goes, because it incorporates information of the smartest traders who keep their separate real information secret, until their trades cause it to be revealed in market prices.

Studies conducted on more advanced and developed market tends to disprove the underlying assumptions of EMH in the weak form that shares prices are un-predictable. According to Osborne (2009), the EMH states that returns (the opening price subtracted from the closing price) of market

indices in efficient markets behave like Brownian motion. In practice, this assumption is violated mostly by the periodic structure (day, week, quarter, and year) of agent behaviour.

2.1 Theoretical Framework

The underpinning theory for this paper is the Efficient Market Hypothesis (EMH).The theory of the efficient markets has a long history and caused a debate between academics and practitioners for many years now. Some studies gave supportive evidence for the EMH and some others, among them the most recent, did not.

EMH assumes three things according to Fama (1970): all information is available to the market; all investors are rational; and that stocks follow a random walk. The assumption about information comes in three flavours with varying measures of strength. Fama (1972) published a reassessment of efficient market hypotheses theory with an empirical base, and distributed market efficiency into three levels based on information: weak, semi-strong and strong form.

The weak EMH makes the assumption that current stock prices reflect all available information. It goes further to say past performance is irrelevant to what the future holds for the stock. Therefore, it assumes that technical analysis can't be used to achieve returns. The semi-strong form of the theory contends stock prices are factored into all information that is publicly available. Therefore, investors cannot use fundamental analysis to beat the market and make significant gains. In the strong form of the theory, all information both public and private—are already factored into the stock prices. So it assumes no one has an advantage to the information available, whether that's someone on the inside or out. Therefore, it implies the market is perfect, and making excessive profits from the market is next to impossible.

The hypothesis was developed in the 1960s by University of Chicago economics professors Harry Roberts and Eugene Fama. The latter then formalized the hypothesis in his 1970 paper, "Efficient Capital Markets: A Review of Theory and Empirical Work.". Fama wrote; "A market in which prices always fully reflect available information is called efficient and for the purposes of most investors, the efficient markets model seems a good first (and second) approximation to reality. In short, the evidence in support of the efficient markets model is extensive and contradictory evidence is also sparse."

3.0 Methods

Most of the studies reviewed used parametric and non-parametric analysis on testing the EMH like the serial correlation

test, runs-test and ARDL, event study, GATCH and variance test-ratio (Osagie et al, 2020; Vasileiou, 2020; Hatmanu & Cautisanu, 2021; Evangelos, 2021; Pillai & Pillai, 2021;). This paper adopts a similar method of using both parametric and non-parametric statistics. The choice of this design is warranted by the fact that it seeks to establish the existence and nature of relationships, associations and interdependence between variables (Kumar, 2005).The non-parametric utilizes the use of run-test and parametric employs correlation and regression analysis using a time series data.

The unit of analysis is the Nigerian Capital Market (NCM) covering April, 2020 to July, 2020.To conduct this study, daily data of 110 working days were collected to measure the impact of Covid-19 on the NCM. We consider the NSE index as proxy of the capital market reactions, which is the reference index of the Capital Market in Nigeria.

The analysis was done in two phases as depicted In Table 2. In the first analysis, we employ a descriptive statistics to explain the pattern and characteristics of the data employed, then followed by a run-test to determine the reactions/randomness of the Nigerian capital market on the proclamation of Covid-19 lockdown. The second analysis explains variables that are related to Covid-19 and some economic fundamentals.

Table 2. Operationalization of the Variables

SYMBOLS	DESCRIPTION/OPERATIONALIZATION	SOURCE
NSEi	**Variables Concerning Stock Market** Nigerian Stock Exchange Index. To measure the impact of Covid-19 on the efficiency of market, we considered NSE index, which is the reference index of the capital market in Nigeria.	Hatmanu & Cautisanu (2021), Evangelos (2021), Tadoori & Vadithata (2021), Pillai & Pillai (2021).
NCC	**Variables Related to Spread of Covid-19** The daily number of Corona Virus new cases in the country	NCDC (Nigerian Centre for Disease Control)
NCD	The daily number of new Covid-19 Death in the country	NCDC
INFL	**Variables Related to Economic Fundamental** Inflation as measure by consumer price index in the country	Central Bank of Nigeria (CBN).
INTR	interest rate as dictated by the monetary authority	CBN.
CRUDE OIL	Brent crude oil is the base price for international oil (fluctuations in oil quotations are always followed by economic and social crisis in any country)	OPEC Data

Source: Designed by the author (2022)

3.1 Model Specification

To measure the impact of the Covid-19 pandemic on stock market efficiency, we employ the run-test statistic. The use of this method is adequate for studies with a lower number of sample sizes. However, regression analysis is applied to confirm the existence of relationship between the explained variable and their regressors.

Following the work of Hatmanu and Cautisanu (2021) that analyzed the impact of Covid-19 on Romanian stock market, this study adapts the model but with a slight adjustment. Based on that, the appropriate model for this study is specified as follows.

$$\Delta NSEi = \sum \beta_1 \Delta Y_{t-1} + \sum_{j=1} \sum + \beta_1 Infl + \beta_2 Ncc + \beta_3 Ncd + \beta_4 Intr + \beta_5 Bco + e.....$$

$$i = 1 \qquad j = 1 \qquad ij = 0$$

Where;

NSE Index = All share index (proxy as market reaction due to Covid-19)

Infl = Inflationary Rate

Ncc = New Corona Case

Ncd = New Corona Death

Intr = Interest Rate

Bco = Brent (International) Crude Oil

β_1- β_4 = The coefficient of the independent variables

e = error term

4.0 Results and Discussions:

In this section, we present some statistical evidence that quantitatively confirms the efficiency or otherwise of Nigerian stock exchange on weak form. Before the efficiency test (run tests), we examined the descriptive statistic of our sample. Table 3, presents the descriptive statistics which revealed that the data during the examined period from April 2020 to July, 2020 were normally distributed. Figure 1, showed the normality of the distribution using a histogram of the NSE index.

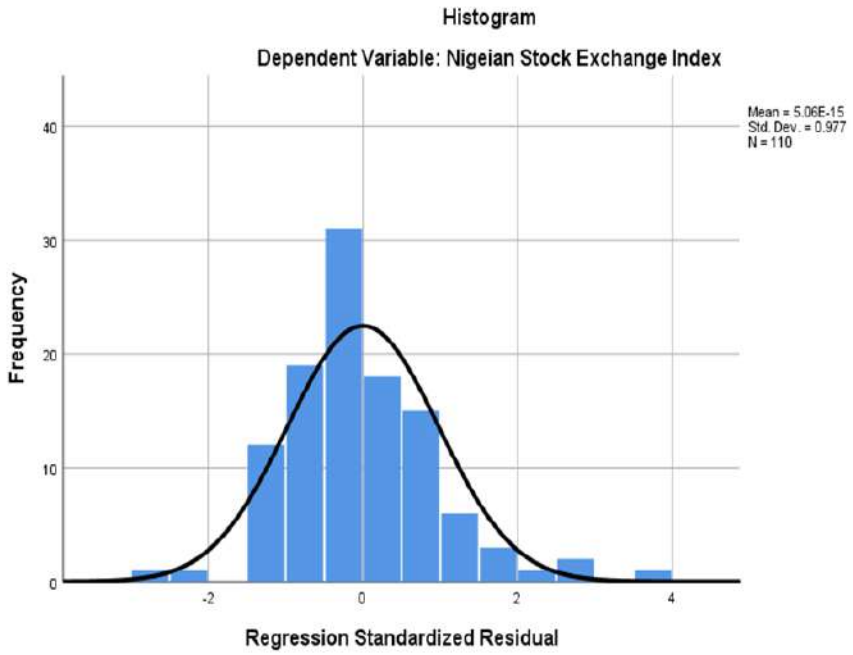
Table 3. Descriptive Statistics of NSE daily Returns during the Period 01-04-2020 to 30-04-2021

Mean	5.06
Maximum	581.59
Minimum	.00
Std. Deviation	0.977
Skewness	0.913
Kurtosis	1.901
Durbin Watson	1.233**

**significant at 5% level

Source: Computed by the author (2021) using SPSS, v.25.

The average daily return of the market is 5.06 with a minimum and maximum of 0.00 and 581.59 respectively, while the standard deviation of the market is 0.977 signified low volatility/reactions. The skewness measures the length of the tail of the distribution and from the table, it revealed that the data is positive and the kurtosis which measures the peak of the curve shows that the data is positive and platykurtic implying that the distribution exhibits flatness at the surface. Figure 3 below shows the normality of the data distribution using a histogram.



Source: Author (2021) using SPSS v.25

4.1 Statistical Evidence Regarding Market Efficiency of Nigerian Capital Market (NCM).

In order to identify the efficiency of Nigerian capital market, we employ a random test (Bradley, 1969) which is used to decide if a data set is from a random process. A run-test is a non-parametric analysis and is defined as a series of increasing values or a series of decreasing values and the number of increasing or decreasing value is the length of the run. To test for hypothesis one, we employ the run-test to detect if there is any randomness of the market within the period under review.

$H_{01:}$ News of Covid-19 lockdown in Nigeria did not reveal Nigerian Capital Market exhibiting a strong, semi-strong and weak form of the EMH.

Table 4: Run Test Analysis

Runs Test

			Nigerian Stock Exchange Index	Inflation	New Corona Case	New Corona Death	International Crude oil	Interest Rate
Test Value[a]			238.1381	16.0575	2979.0909	34.7727	55.9018	11.7727
Cases < Test Value			63	30	71	70	55	80
Cases >= Test Value			47	80	39	40	55	30
Total Cases			110	110	110	110	110	110
Number of Runs			33	6	44	41	10	10
Z			-4.275	-9.352	-1.539	-2.260	-8.812	-8.384
Asymp. Sig. (2-tailed)			.000	.000	.124	.024	.000	.000
Monte Carlo Sig. (2-tailed)	Sig.		.000[b]	.000[b]	.132[b]	.027[b]	.000[b]	.000[b]
	99% Confidence Interval	Lower Bound	.000	.000	.124	.023	.000	.000
		Upper Bound	.000	.000	.141	.031	.000	.000

a. Mean

b. Based on 10000 sampled tables with starting seed 2000000.

Source: Computed by the author (2022) using SPSS V.25

Table 4 revealed the result of the run-test carried out from April, 2020 to April, 2021 during the Covid-19 using time series data of the NCM. The decision rule is that if the test statistic (Z-value) is greater than the critical value (upper bound), we conclude that the data is not random at 5% level of significance.

Therefore, since the test statistic in Table 4 (Z = -4.275) is less than the critical value (upper Bound = 0.00) using Monte Carlos critical value number, we reject the null hypothesis that, the time sequence of the NSE index data during reviewed period is not produced in random manner, which signifies the assumption of the EMH theory. We can therefore conclude that, the Nigerian Capital market exhibited a weak form of EMH as information regarding the Corona Virus was incorporated slowly but not instantaneously.

The above finding is consistent with the findings of Kantal et al. (2021), Chowdhury et al. (2021) and Ozilli and Arun (2020) as regards Nigerian stock market exhibiting a weak form of EMH in their various studies

but at the same time the study contradicts that of Latham (2013), Pillai and Pillai (2021), Tadoori and Vadithata (2021) and Evangelos (2021).

To test hypothesis 2, we employ a regression analysis to determine the impact of the explanatory variables on the explained variable. To confirm the assumptions of regression analysis a correlation analysis is conducted first, in order to ascertain the association of the explained and the explanatory variables. The table of the correlation analysis is presented in Table 5:

Table 5: Correlation Statistics

	Nigerian stock Exchange index	Inflation	New Corona Case	New Corona Death	Brent Crude oil	Interest Rate
Nigerian Stock Exchange Index	1					
Inflation	-.210* (0.02)	1				
New Corona Case	.165 (0.08)	.230*	1			
New Corona Death	.125 (0.19)	-.001 (0.9)	.086 (0.37)	1		
Brent Crude Oil	.185 (0.05)	.144 (0.13)	.059 (0.54)	.074 (0.44)	1	
Interest Rate	-.126 (0.19)	.134 (-.069)	.544 (-.100)	.091 (0.34)	-.718* (.000)	1

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed)

Source: Computed by the Author (2022) using SPSS 25.

The dependent variable when correlated with the independent variables revealed no correlation, also the independent variables revealed the same results (no correlation among them). This result confirms that regression analysis can be run.

Table 6: Regression Model

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.882[a]	.777	.255	82.93625	.777	3.558	5	104	.005	1.223

a. Predictors: (Constant), Interest Rate, Inflation, New Corona Death, New Corona Case, International Crude oil

b. Dependent Variable: Nigerian Stock Exchange Index

source: Author's computation (2022) using SPSS v.25

The model summary indicates that the R-square is .777 which means the models explain 77% of the variables involved and the remaining 23% were explained by other variables not in the model. The Durbin-Watson Figure of 1.223 which measure autocorrelation is found to be within acceptable limit according to Gujarati (1999) Table of 2.636.

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	122350.843	5	24470.169	3.558	.005[b]
	Residual	715355.835	104	6878.421		
	Total	837706.677	109			

a. Dependent Variable: Nigerian Stock Exchange Index

b. Predictors: (Constant), Interest Rate, Inflation, New Corona Death, New Corona Case, International Crude oil

Source: Author's computation (2022) using SPSS v.25

The Anova has an F-statistic of 3.558 and statistically significant at 5% level. Based on that the model can be rely upon for making prediction.

To test for hypothesis 2a to 2d, we employ regression analysis and the result is presented in table 6 below

Table 6: Regression Analysis Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	292.644	337.159		.868	.387
	Inflation	-14.046	4.557	-.291	-3.083	.003
	New Corona Case	.007	.003	.215	2.279	.025
	New Corona Death	.227	.247	.086	.917	.361
	International Crude oil	1.123	.647	.233	1.735	.086
	Interest Rate	6.840	26.273	.035	.260	.795

a. Dependent Variable: Nigerian Stock Exchange Index

To estimate the relevant contributions of the independent variables and their level of relationship vis-a-vis the explained variable, Table 6 provided the coefficients of each of the explanatory variables. Inflation reveals a negative relationship (-14.046) with NSE index but is statistically significant (.003) at 5% level. The coefficient of New Corona Case is positive (.007) and weak but statistically significant (.02) at 5% level. While the coefficient of New Corona death also shows positive relationship (.227), but statistically not significant (.361). International crude oil has a positive coefficient (1.123) and statistically significant (.086) at 10% level. The interest rate is also having a strong positive relationship (6.840) but statistically not significant (.795).

The above result is therefore consistent with the findings of Hatmanu and Cautisanu (2021), Osagie, Maijama'a and John (2020), Zoughrana, et al. (2021), El-Sayed and Abdelhakim (2021). The findings also aligned with Carlson (2020), Bark, Flynn and Homanen (2020) but contradicts Al-Awadhi, et al (2021) and Adenomon, et al (2021).

5.0 Conclusions and Recommendations

The aim of the paper was to review the efficacy of EMH and its resultant effects on Nigerian capital market as a result of Covid-19 pandemic. The Efficient Market Hypothesis (or EMH, as it is known) suggests that investors cannot make returns above the average of the market on a consistent basis. This is because under normal circumstances, all available information about asset values and prices is rapidly disseminated throughout the market bringing prices quickly to an equilibrium value.

This study found that Nigerian capital market exhibited weak form of EMH as information absorption capacity during the Covid-19 and its protocols were slow and not instantaneous. Based on that, the Nigerian capital market exhibited a weak form of EMH as information about the Corona Virus has not significantly impacted on the trading activities of the markets and therefore, not fully efficient and the digestive power of absorbing information by the Nigerian capital markets is low.

The regression results showed that economic fundamental revealed that inflation was significant and that is why during the pandemic the Nigerian economy did not only slides into recession because of lack of production together with the contagious effect of the global economy, which leads to prices of commodities going in up (inflation). The interest rate was not significant, hence, did not affect the

economy during the pandemic. The international crude oil was significant and positive showing that the economy suffered because of lack of demand from the global oil markets.

The pandemic variable especially did affect the economy as New Corona cases were found to be significant. For any information about the new cases, it will have a profound effect on the economy since investors cannot invest and production activities waned down.

Finally, Prof. Eugene Fama deserves enormous credit for enhancing our understanding of how both investor sentiment and fundamental information about individual companies and the economy influence stock prices. He correctly elucidated how some investors make consistent and predictable errors in the processing of information and how the propagation of narratives about the stock market can become self-fulfilling. This paper used the randomness (Table 4) of the market in response to the COVID-19 pandemic as an example of the market's apparent irrationality.

The EMH incorporates two fundamental tenets. It first asserts that public information gets reflected in asset prices without delay. The COVID-19 pandemic presents an excellent example of how investor sentiment and the difficulty of predicting the extent and severity of the resulting economic disruption can intensify market volatility. However, it is far from clear that systematic under-reaction or over-reaction to news presents an arbitrage opportunity promising traders extraordinary gains. It is this aspect of EMH that implies a second and in our view, the most fundamental tenet of the hypothesis: That is, in an efficient market, no arbitrage (gain) opportunities exist and we can see that playing out clearly not only in the Nigerian capital markets but responses across the global capital markets due to the Covid-19 pandemic.

Based on the conclusion, this study makes the following recommendations to our policy makers:

In a period of rapid turbulence like the Covid-19 pandemic, the market need to be insulated by the government through the regulators (Security and Exchange Commission [SEC]) by providing a hedging mechanism in order to reduce loss to investors.

The issue of securitization of shares should be enhanced and given prominence by the Nigerian capital market so as to make potential and intending investors bought and trade their share electronically from the comfort of their homes, in order to safeguard

their safety from getting infected with the Covid-19.

With the world being a global village, the Nigerian government needs to intensify efforts to vaccinate its people against the pandemic so as not have adverse effects of the virus in the near future that can derail the achievement so far recorded in the stock market and the economy at large

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